

What is claimed is:

1 1. A system for receiving data regarding usage of a utility product at a plurality
2 of remote locations, wherein

3 said system comprises a central computer system, a database accessed by
4 said computer system, a plurality of meters, and a communication network
5 connecting each meter within said plurality of meters with said central computer
6 system to transmit data to said central computer system,

7 said database stores a plurality of data records,

8 each data record in said plurality of data records includes a meter identifier
9 identifying a meter within said plurality of meters associated with said data record
10 and a public cryptographic key of said meter,

11 each of said meters includes data storage storing a private cryptographic
12 key of said meter and a microprocessor accessing said data storage and
13 programmed to encrypt a message with said private cryptographic key and to
14 transmit said message encrypted with said private cryptographic key, wherein said
15 message includes an alphanumeric value together with a data value representing a
16 measured usage of said utility product, over said communication network to said
17 central computer system,

18 information encrypted with said private cryptographic key is decrypted with
19 said public cryptographic key, and

20 said central computer system includes a processor programmed to receive
21 said message encrypted with said private cryptographic key, to decrypt with said
22 public cryptographic key of said meter, said message encrypted with said private
23 cryptographic key, forming a decrypted message, and to compare a version of said
24 alphanumeric value from said decrypted message with unencrypted version of said
25 alphanumeric value.

1 2. The system of claim 1, wherein
2 each of said meters additionally comprises an emitter generating a pulsed
3 signal with said measured usage of said utility product,
4 said data storage within each of said meters additionally stores said value
5 representing said measured usage of said utility product, and
6 said microprocessor within each of said meters is additionally programmed
7 to receive said pulsed signal, to update said value stored within said data storage
8 with pulses within said pulsed signal, and to read said value from said data storage
9 for transmission of said value to said central computer system.

1 3. The system of claim 1, wherein
2 each of said meters includes a circuit producing a tamper evident signal in
3 response to detecting tampering with said meter by disconnecting said meter from
4 said utility product or by opening a cover of said meter, and
5 said microprocessor within each of said meters is additionally programmed
6 to prevent further transmission of utility usage data in response to said tamper
7 evident signal.

1 4. The system of claim 3, wherein further transmission of utility usage data is
2 prevented by erasing said private cryptographic key stored within said data
3 storage.

1 5. The system of claim 1, wherein
2 said communication network additionally connects each meter within said
3 plurality of meters with said central computer system to receive data from said
4 central computer system,
5 said processor in said central computer system is additionally programmed
6 to generate and store a random value to be used as said alphanumeric value, to
7 call each meter in said plurality of meters on a periodic basis over said

8 communication network and to transmit said random value to said meter, and to
9 store said data derived from said data value representing a measured usage of
10 said utility product within said data record including said meter identifier identifying
11 said meter in response to determining that said decrypted message matches said
12 unencrypted version of said message, and

13 said microprocessor in each meter in said plurality of meters is additionally
14 programmed to receive said random value transmitted over said communication
15 network as said alphanumeric value to be encrypted.

1 6. The system of claim 5, wherein said microprocessor in each meter in said
2 plurality of meters is additionally programmed to determine whether a call received
3 over said communication network has come from said central computer system.

1 7. The system of claim 6, wherein
2 said communications network includes a switched telephone network, and
3 a determination of whether said call received over said communication
4 network is made using a process for identifying a caller over a telephone network.

1 8. The system of claim 1, wherein
2 said microprocessor in each meter in said plurality of meters is additionally
3 programmed to generate an ordered sequence of values for use as each said
4 alphanumeric value, and to transmit, on a periodic basis, to said central computer
5 system, a next value from said ordered sequence of alphanumeric values, in an
6 unencrypted form and as combined with said value representing said measured
7 usage of said utility product and encrypted with said private cryptographic key, and
8 said processor within said central computer system is additionally
9 programmed to receive said unencrypted form of said value in said ordered
10 sequence of values as unencrypted version of said alphanumeric value, to
11 determine whether said alphanumeric value received as said message follows,

12 within said ordered sequence of alphanumeric values, a version of said
13 alphanumeric value previously transmitted from said meter, and to store data
14 derived from said value representing a measured usage of said utility product within
15 said data record including said meter identifier identifying said meter in response
16 to determining that said decrypted message matches said unencrypted version of
17 said message together with determining that said alphanumeric value follows said
18 version of said alphanumeric value previously transmitted from said meter.

1 9. The system of claim 8, wherein said central computer system is additionally
2 programmed to read said version of said alphanumeric value previously transmitted
3 from said meter from said data record including said meter identifier identifying
4 said meter and to write said alphanumeric value received as said message to said
5 data record including said meter identifier.

1 10. The system of claim 1, wherein said central computer system is additionally
2 programmed to receive a transmission over said communication network from an
3 additional meter, to recognize a set up request code transmitted from said
4 additional meter, to receive a meter identifier and a public cryptographic key from
5 said additional meter, and to record said meter identifier and said public
6 cryptographic key received from said additional meter in an additional data record
7 within said database.

1 11. The system of claim 1, additionally comprising a server computer having an
2 interface for communicating over a computer network with at least one client
3 computer and accessing said database, wherein
4 said server computer receives data from said client computer including a
5 meter identifier stored in a data record within said database, and
6 said server computer writes data received from said client computer to said
7 data record within said database.

1 12. A central computer system for receiving data regarding usage of a utility
2 product at a plurality of remote locations, wherein said computer system comprises:
3 a database storing a plurality of data records, wherein each data record in
4 said plurality of data records includes a meter identifier identifying a meter within a
5 plurality of meters associated with said data record and a public cryptographic key
6 of said meter; and
7 a processor programmed to receive a meter identifier and message
8 encrypted with a private cryptographic key, wherein said message includes an
9 alphanumeric value and a data value representing a measured usage of said utility
10 product, transmitted over a communication network, to find a public cryptographic
11 key within said data base in a data record storing said meter identifier, to decrypt,
12 with said public cryptographic key of said meter, said message encrypted with said
13 private cryptographic key, forming a decrypted message, and to compare a version
14 of said alphanumeric value within said decrypted message with an unencrypted
15 version of said alphanumeric value.

1 13. The central computer system of claim 12, wherein said processor in said
2 central computer system is additionally programmed to:
3 generate and store a random value to be used as said alphanumeric value,
4 call each meter in said plurality of meters on a periodic basis over said
5 communication network and to transmit said random alphanumeric value to said
6 meter, and
7 store data derived from said data value representing a measured usage of
8 said utility product within said data record including said meter identifier identifying
9 said meter in response to determining that said version of said alphanumeric value
10 within said decrypted message matches said unencrypted version of said
11 alphanumeric value.

1 14. The central computer system of claim 12, wherein said processor within said
2 central computer system is additionally programmed to:
3 receive an unencrypted form of a alphanumeric value,
4 determine whether said alphanumeric value received follows, within an
5 ordered sequence of alphanumeric values, a version of a alphanumeric value
6 previously transmitted from a meter identified by said meter identifier as said
7 message, and
8 store data derived from said value representing a measured usage of said
9 utility product within said data record including said meter identifier identifying said
10 meter in response to determining that said alphanumeric value from said decrypted
11 message matches said unencrypted version of said alphanumeric value together
12 with determining that said alphanumeric value follows said version of said
13 alphanumeric value previously transmitted from said meter

1 15. The central computer system of claim 14, wherein said central computer
2 system is additionally programmed to read said version of said alphanumeric value
3 previously transmitted from said meter from said data record including said meter
4 identifier and to write said alphanumeric value received to said data record
5 including said meter identifier.

1 16. A meter for measuring usage of a utility product and for transmitting data
2 representing said usage to be recorded at a remote location, wherein said meter
3 comprises:
4 data storage storing a private cryptographic key of said meter;
5 a communication adapter for data communication over a communication
6 network; and
7 a microprocessor accessing said data storage and programmed to encrypt
8 a message with said private cryptographic key and to transmit said message
9 encrypted with said private cryptographic key, wherein said message includes an

10 alphanumeric value and a data value representing a measured usage of said utility
11 product over said communication network.

1 17. The meter of claim 16, wherein

2 said meter additionally comprises an emitter generating a pulsed signal with
3 said measured usage of said utility product,

4 said data storage additionally stores said value representing said measured
5 usage of said utility product, and

6 said microprocessor is additionally programmed to receive said pulsed
7 signal, to update said value stored within said data storage with pulses within said
8 pulsed signal, and to read said value from said data storage for transmission of
9 said value over said communication network.

1 18. The meter of claim 16, wherein

2 said meter additionally includes a circuit producing a tamper evident signal
3 in response to detecting tampering with said meter by disconnecting said meter
4 from said utility product or by opening a cover of said meter, and

5 said microprocessor is additionally programmed to prevent further
6 transmission of utility usage data in response to said tamper evident signal.

1 19. The meter of claim 18, wherein further transmission of utility usage data is
2 prevented by erasing said private cryptographic key stored within said data
3 storage.

1 20. The meter of claim 16, wherein said microprocessor is additionally
2 programmed to receive a random value transmitted over said communication
3 network as said alphanumeric value to be encrypted.

1 21. The meter of claim 16, wherein said microprocessor is additionally

2 programmed to determine whether a call received over said communication
3 network has come from said central computer system.

1 22. The system of claim 16, wherein said microprocessor is additionally
2 programmed to generate an ordered sequence of values for use as said
3 alphanumeric value, and to transmit, on a periodic basis, to said central computer
4 system, a next value from said ordered sequence of values, in an unencrypted form
5 and as combined with said data value representing said measured usage of said
6 utility product, and encrypted with said private cryptographic key.

1 23. A method for transmitting data regarding usage of a utility product to a
2 remote location and for storing said data in said remote location, wherein said
3 method comprises:

4 a) generating said data within a meter in response to usage of said utility
5 product;

6 b) storing said data within said meter;

7 c) encrypting a message with a private cryptographic key stored within said
8 meter, wherein said message includes an alphanumeric value and a data value
9 representing utility usage derived from said data stored within said meter;

10 d) transmitting said message encrypted with said private cryptographic key
11 over a communication network to a remote central computer system;

12 e) decrypting said message encrypted with said private cryptographic key
13 within said remote central computer using a public cryptographic key of said meter
14 stored within a database accessed by said remote central computer, wherein said
15 public cryptographic key decrypts information encrypted with said private
16 cryptographic key; and

17 f) comparing said alphanumeric value decrypted in step e) with an
18 unencrypted version of said alphanumeric value.

1 24. The method of claim 23, wherein step a) is preceded by:
2 g) transmitting said public cryptographic key of said meter, along with an
3 identifier of said meter, from said meter to said central computer over said
4 communication network; and
5 h) writing said identifier of said meter and said public cryptographic key of
6 said meter within a data record in said database accessed by said central
7 computer.

1 25. The method of claim 23, wherein
2 step a) is preceded by following steps i) through k):
3 i) generating a random value in said central computer and storing
4 said random value as said unencrypted version of said alphanumeric value;
5 j) initiating a call over said communication network from said central
6 computer to said meter; and
7 k) transmitting said random value as said alphanumeric value over
8 said communication network from said central computer to said meter, and
9 step e) is followed by:
10 l) storing said utility usage data transmitted from said meter in step
11 d) in response to a determination in step f) that said alphanumeric value
12 decrypted in step e) matches said unencrypted version of said alphanumeric
13 value.

1 26. The method of claim 25, wherein
2 step l) is preceded by following steps m) through n):
3 m) transmitting said public cryptographic key of said meter, along
4 with an identifier of said meter, from said meter to said central computer
5 over said communication network; and
6 n) writing said identifier of said meter and said public cryptographic
7 key of said meter within a data record in said database accessed by said

8 central computer, and
9 in step l) said utility usage data is stored in said data record in said
10 database accessed by said central computer.

1 27. The method of claim 23, wherein
2 step a) is preceded by following steps o) through p):
3 o) generating and storing a sequential value to be encrypted as said
4 alphanumeric value within a predetermined sequence of sequential values
5 within said meter, and
6 p) initiating a call over said communication network from said meter
7 to said central computer,
8 in step d), said sequential value is additionally transmitted in an unencrypted
9 form, along with said message encrypted with said private cryptographic key, and
10 step f) is followed by following steps q) through r):
11 q) determining in said central computer system whether said
12 alphanumeric value additionally transmitted in an unencrypted form in step d)
13 follows a alphanumeric value additionally transmitted by said meter in said
14 predetermined sequence of alphanumeric values, and
15 r) storing said utility usage data transmitted from said meter in step
16 d) in response to a determination in step f) that said message decrypted in
17 step e) matches said unencrypted version of said message together with a
18 determination in step o) that said alphanumeric value additionally transmitted
19 in an unencrypted form in step d) follows a alphanumeric value additionally
20 transmitted by said meter in said predetermined sequence of alphanumeric
21 values.

1 28. The method of claim 27, wherein
2 step o) is preceded by following steps s) through t):
3 s) transmitting said public cryptographic key of said meter, along with

4 an identifier of said meter, from said meter to said central computer over
5 said communication network; and

6 t) writing said identifier of said meter and said public cryptographic
7 key of said meter within a data record in said database accessed by said
8 central computer, and

9 in step r) said utility usage data is stored, along with said alphanumeric value
10 additionally transmitted by said meter in said data record in said database
11 accessed by said central computer.

1 29. A method for transmitting data regarding usage of a utility product to a
2 remote location, wherein said method comprises:

3 a) generating said data within a meter in response to usage of said utility
4 product;

5 b) storing said data within said meter;

6 c) encrypting a message with a private cryptographic key stored within said
7 meter, wherein said message includes an alphanumeric value and a data value
8 representing utility usage derived from said data stored within said meter; and

9 d) transmitting said message encrypted with said private cryptographic key
10 over a communication network to a remote central computer system.

1 30. The method of claim 29, wherein step a) is preceded by transmitting said
2 public cryptographic key of said meter, along with an identifier of said meter, from
3 said meter to said central computer over said communication network.

1 31. The method of claim 29, wherein step a) is preceded by:

2 e) receiving said alphanumeric value in a call over said communication
3 network initiated by said central computer system.

1 32. The method of claim 31, wherein step e) is preceded by transmitting said

2 public cryptographic key of said meter, along with an identifier of said meter, from
3 said meter to said central computer over said communication network.

1 33. The method of claim 29, wherein
2 step a) is preceded by following steps f) through g):
3 f) generating and storing a value to be encrypted as said
4 alphanumeric value within a predetermined sequence of values in said
5 meter, and
6 g) initiating a transmission over said communication network from
7 said meter to said central computer, and
8 in step d), said alphanumeric value is additionally transmitted in an
9 unencrypted form, along with said message encrypted with said private
10 cryptographic key.

1 34. The method of claim 33, wherein step f) is preceded by transmitting said
2 public cryptographic key of said meter, along with an identifier of said meter, from
3 said meter to said central computer over said communication network.
4

5 35. A method for receiving data regarding usage of a utility product from a meter
6 in a remote location within a central computer and for storing said data, wherein
7 said method comprises:

8 a) receiving an encrypted message transmitted over a communication
9 network from a meter, wherein said message includes an alphanumeric value and
10 utility usage data;

11 b) decrypting said message using a public cryptographic key of said meter
12 stored within a database accessed by said central computer, wherein said public
13 cryptographic key decrypts information encrypted with said private cryptographic
14 key; and

15 c) comparing said alphanumeric value in said message decrypted in step b)

16 with an unencrypted version of said alphanumeric value.

1 36. The method of claim 35, wherein step a) is preceded by:

2 d) receiving said public cryptographic key of said meter, along with an
3 identifier of said meter, transmitted from said meter to said central computer over
4 said communication network; and

5 e) writing said identifier of said meter and said public cryptographic key of
6 said meter within a data record in said database accessed by said central
7 computer.

1 37. The method of claim 35, wherein

2 step a) is preceded by following steps f) through k):

3 f) generating a random value in said central computer and storing
4 said random value as said unencrypted version of said alphanumeric value;

5 g) initiating a call over said communication network from said central
6 computer to said meter; and

7 h) transmitting said random value as said alphanumeric value over
8 said communication network from said central computer to said meter, and

9 step c) is followed by:

10 i) storing said utility usage data transmitted from said meter in step
11 a) in response to a determination in step c) that said alphanumeric value
12 from said message decrypted in step b) matches said unencrypted version
13 of said alphanumeric value.

1 38. The method of claim 37, wherein

2 step i) is preceded by following steps j) through k):

3 j) transmitting said public cryptographic key of said meter, along with
4 an identifier of said meter, from said meter to said central computer over
5 said communication network; and

6 k) writing said identifier of said meter and said public cryptographic
7 key of said meter within a data record in said database accessed by said
8 central computer, and
9 in step i) said utility usage data is stored in said data record in said
10 database accessed by said central computer.

1 39. The method of claim 35, wherein
2 said encrypted message is received in step a) as a portion of a
3 transmission initiated by said meter, together with said unencrypted form of said
4 alphanumeric value, and
5 step c) is followed by following steps l) through m):
6 l) determining in said central computer system whether said
7 alphanumeric value additionally transmitted in an unencrypted form in step d)
8 follows an alphanumeric value additionally transmitted by said meter in said
9 predetermined sequence of alphanumeric values, and
10 m) storing said utility usage data transmitted from said meter in
11 step d) in response to a determination in step f) that said alphanumeric value
12 from said message decrypted in step b) matches said unencrypted version
13 of said alphanumeric value together with a determination in step o) that said
14 alphanumeric value additionally transmitted in an unencrypted form in step d)
15 follows an alphanumeric value additionally transmitted by said meter in said
16 predetermined sequence of alphanumeric values.

1 40. The method of claim 39, wherein
2 step a) is preceded by following steps n) through o):
3 n) receiving said public cryptographic key of said meter, along with
4 an identifier of said meter, transmitted from said meter over said
5 communication network; and
6 o) writing said identifier of said meter and said public cryptographic

7 key of said meter within a data record in said database accessed by said
8 central computer, and
9 in step m) said utility usage data is stored, along with said alphanumeric
10 value additionally transmitted by said meter in said data record in said database.

1 41. A computer readable medium having computer readable program code
2 embodied therein causing a microprocessor within a meter measuring usage of a
3 utility product to perform a method for transmitting data regarding usage of said
4 utility product to a remote location, wherein said method comprises:

5 a) generating said data within a meter in response to usage of said utility
6 product;

7 b) storing said data within said meter;

8 c) encrypting a message with a private cryptographic key stored within said
9 meter, wherein said message includes an alphanumeric value and a data value
10 representing utility usage derived from said data stored within said meter; and

11 d) transmitting said message encrypted with said private cryptographic key
12 over a communication network to a remote central computer system.

1 42. The computer readable medium of claim 41, wherein step a) is preceded by
2 transmitting said public cryptographic key of said meter, along with an identifier of
3 said meter, from said meter to said central computer over said communication
4 network.

1 43. The computer readable medium of claim 41, wherein step a) is preceded
2 by:

3 e) receiving said alphanumeric value in a call over said communication
4 network initiated by said central computer system.

1 44. The computer readable medium of claim 43, wherein step e) is preceded

2 by transmitting said public cryptographic key of said meter, along with an identifier
3 of said meter, from said meter to said central computer over said communication
4 network.

1 45. The computer readable medium of claim 41, wherein
2 step a) is preceded by following steps f) through g):

3 f) generating and storing a value to be encrypted as said
4 alphanumeric value within a predetermined sequence of values in said
5 meter, and

6 g) initiating a transmission over said communication network from
7 said meter to said central computer, and

8 in step d), said alphanumeric value is additionally transmitted in an
9 unencrypted form, along with said message encrypted with said private
10 cryptographic key.

1 46. The computer readable medium of claim 45, wherein step f) is preceded
2 by transmitting said public cryptographic key of said meter, along with an identifier
3 of said meter, from said meter to said central computer over said communication
4 network.

1 47. A computer readable medium having computer readable program code
2 embodied therein causing a processor within a computer to perform a method for
3 receiving data regarding usage of a utility product from a meter in a remote location
4 within a central computer and for storing said data, wherein said method
5 comprises:

6 a) receiving an encrypted message transmitted over a communication
7 network from a meter, wherein said message includes an alphanumeric value and
8 utility usage data;

9 b) decrypting said message using a public cryptographic key of said meter

10 stored within a database accessed by said central computer, wherein said public
11 cryptographic key decrypts information encrypted with said private cryptographic
12 key; and

13 c) comparing said alphanumeric value in said message decrypted in step b)
14 with an unencrypted version of said alphanumeric value.

1 48. The computer readable medium of claim 47, wherein step a) is preceded by:

2 d) receiving said public cryptographic key of said meter, along with an
3 identifier of said meter, transmitted from said meter to said central computer over
4 said communication network; and

5 e) writing said identifier of said meter and said public cryptographic key of
6 said meter within a data record in said database accessed by said central
7 computer.

1 49. The computer readable medium of claim 47, wherein

2 step a) is preceded by following steps f) through k):

3 f) generating a random value in said central computer and storing
4 said random value as said unencrypted version of said alphanumeric value;

5 g) initiating a call over said communication network from said central
6 computer to said meter; and

7 h) transmitting said random value as said alphanumeric value over
8 said communication network from said central computer to said meter, and

9 step c) is followed by:

10 i) storing said utility usage data transmitted from said meter in step
11 a) in response to a determination in step c) that said alphanumeric value
12 from said message decrypted in step b) matches said unencrypted version
13 of said alphanumeric value.

1 50. The computer readable medium of claim 49, wherein

2 step i) is preceded by following steps j) through k):
3 j) transmitting said public cryptographic key of said meter, along with
4 an identifier of said meter, from said meter to said central computer over
5 said communication network; and
6 k) writing said identifier of said meter and said public cryptographic
7 key of said meter within a data record in said database accessed by said
8 central computer, and
9 in step i) said utility usage data is stored in said data record in said
10 database accessed by said central computer.

1 51. The computer readable medium of claim 47, wherein
2 said encrypted message is received in step a) as a portion of a
3 transmission initiated by said meter, together with said unencrypted form of said
4 alphanumeric value, and
5 step c) is followed by following steps l) through m):
6 l) determining in said central computer system whether said
7 alphanumeric value additionally transmitted in an unencrypted form in step d)
8 follows an alphanumeric value additionally transmitted by said meter in said
9 predetermined sequence of alphanumeric values, and
10 m) storing said utility usage data transmitted from said meter in
11 step d) in response to a determination in step f) that said alphanumeric value
12 from said message decrypted in step b) matches said unencrypted version
13 of said alphanumeric value together with a determination in step o) that said
14 alphanumeric value additionally transmitted in an unencrypted form in step d)
15 follows an alphanumeric value additionally transmitted by said meter in said
16 predetermined sequence of alphanumeric values.

1 52. The computer readable medium of claim 51, wherein
2 step a) is preceded by following steps n) through o):

3 n) receiving said public cryptographic key of said meter, along with
4 an identifier of said meter, transmitted from said meter over said
5 communication network; and
6 o) writing said identifier of said meter and said public cryptographic
7 key of said meter within a data record in said database accessed by said
8 central computer, and
9 in step m) said utility usage data is stored, along with said alphanumeric
10 value additionally transmitted by said meter in said data record in said database.

1 53. A computer data signal embodied in a carrier wave comprising program
2 code causing a microprocessor within a meter measuring usage of a utility product
3 to perform a method for transmitting data regarding usage of said utility product to a
4 remote location, wherein said method comprises:

5 a) generating said data within a meter in response to usage of said utility
6 product;
7 b) storing said data within said meter;
8 c) encrypting a message with a private cryptographic key stored within said
9 meter, wherein said message includes an alphanumeric value and a data value
10 representing utility usage derived from said data stored within said meter; and
11 d) transmitting said message encrypted with said private cryptographic key
12 over a communication network to a remote central computer system.

1 54. The computer data signal of claim 53, wherein step a) is preceded by
2 transmitting said public cryptographic key of said meter, along with an identifier of
3 said meter, from said meter to said central computer over said communication
4 network.

1 55. The computer data signal of claim 54, wherein step a) is preceded by:
2 e) receiving said alphanumeric value in a call over said communication

3 network initiated by said central computer system.

1 56. The computer data signal of claim 55, wherein step e) is preceded by
2 transmitting said public cryptographic key of said meter, along with an identifier of
3 said meter, from said meter to said central computer over said communication
4 network.

1 57. The computer data signal of claim 53, wherein
2 step a) is preceded by following steps f) through g):

3 f) generating and storing a value to be encrypted as said
4 alphanumeric value within a predetermined sequence of values in said
5 meter, and

6 g) initiating a transmission over said communication network from
7 said meter to said central computer, and

8 in step d), said alphanumeric value is additionally transmitted in an
9 unencrypted form, along with said message encrypted with said private
10 cryptographic key.

1 58. The computer data signal of claim 57, wherein step f) is preceded by
2 transmitting said public cryptographic key of said meter, along with an identifier of
3 said meter, from said meter to said central computer over said communication
4 network.

1 59. A computer data signal embodied in a carrier wave comprising program
2 code causing a processor within a computer to perform a method for receiving data
3 regarding usage of a utility product from a meter in a remote location within a
4 central computer and for storing said data, wherein said method comprises:

5 a) receiving an encrypted message transmitted over a communication
6 network from a meter, wherein said message includes an alphanumeric value and

7 utility usage data;

8 b) decrypting said message using a public cryptographic key of said meter
9 stored within a database accessed by said central computer, wherein said public
10 cryptographic key decrypts information encrypted with said private cryptographic
11 key; and

12 c) comparing said alphanumeric value in said message decrypted in step b)
13 with an unencrypted version of said alphanumeric value.

1 60. The computer data signal of claim 59, wherein step a) is preceded by:

2 d) receiving said public cryptographic key of said meter, along with an
3 identifier of said meter, transmitted from said meter to said central computer over
4 said communication network; and

5 e) writing said identifier of said meter and said public cryptographic key of
6 said meter within a data record in said database accessed by said central
7 computer.

1 61. The computer data signal of claim 59, wherein
2 step a) is preceded by following steps f) through k):

3 f) generating a random value in said central computer and storing
4 said random value as said unencrypted version of said alphanumeric value;

5 g) initiating a call over said communication network from said central
6 computer to said meter; and

7 h) transmitting said random value as said alphanumeric value over
8 said communication network from said central computer to said meter, and
9 step c) is followed by:

10 i) storing said utility usage data transmitted from said meter in step
11 a) in response to a determination in step c) that said alphanumeric value
12 from said message decrypted in step b) matches said unencrypted version
13 of said alphanumeric value.

1 62. The computer data signal of claim 61, wherein
2 step i) is preceded by following steps j) through k):
3 j) transmitting said public cryptographic key of said meter, along with
4 an identifier of said meter, from said meter to said central computer over
5 said communication network; and
6 k) writing said identifier of said meter and said public cryptographic
7 key of said meter within a data record in said database accessed by said
8 central computer, and
9 in step i) said utility usage data is stored in said data record in said
10 database accessed by said central computer.

1 63. The computer data signal of claim 59, wherein
2 said encrypted message is received in step a) as a portion of a
3 transmission initiated by said meter, together with said unencrypted form of said
4 alphanumeric value, and
5 step c) is followed by following steps l) through m):
6 l) determining in said central computer system whether said
7 alphanumeric value additionally transmitted in an unencrypted form in step d)
8 follows an alphanumeric value additionally transmitted by said meter in said
9 predetermined sequence of alphanumeric values, and
10 m) storing said utility usage data transmitted from said meter in
11 step d) in response to a determination in step f) that said alphanumeric value
12 from said message decrypted in step b) matches said unencrypted version
13 of said alphanumeric value together with a determination in step o) that said
14 alphanumeric value additionally transmitted in an unencrypted form in step d)
15 follows an alphanumeric value additionally transmitted by said meter in said
16 predetermined sequence of alphanumeric values.

1 64. The computer data signal of claim 63, wherein
2 step a) is preceded by following steps n) through o):
3 n) receiving said public cryptographic key of said meter, along with
4 an identifier of said meter, transmitted from said meter over said
5 communication network; and
6 o) writing said identifier of said meter and said public cryptographic
7 key of said meter within a data record in said database accessed by said
8 central computer, and
9 in step m) said utility usage data is stored, along with said alphanumeric
10 value additionally transmitted by said meter in said data record in said database.